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05514 7590 04/22/2004

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

MATHEWS, ALAN A

ART UNIT

PAPER NUMBER

2851

DATE MAILED: 04/22/2004

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,297	05/01/2001	Akihiro Nakauchi	862.C2217	3006

TITLE OF INVENTION: PROJECTION EXPOSURE APPARATUS HAVING ABERRATION MEASUREMENT DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	07/22/2004

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

05514 7590 04/22/2004

**FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112**

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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nonprovisional	NO	\$1330	\$300	\$1630	07/22/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
MATHEWS, ALAN A	2851	355-068000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1	_____
2	_____
3	_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent); ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
- ☐ Publication Fee
- ☐ Advance Order - # of Copies _____

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- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

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FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112				
			EXAMINER MATHEWS, ALAN A	
			ART UNIT 2851	PAPER NUMBER

DATE MAILED: 04/22/2004

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 44 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 44 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability

Application No.

09/845,297

Examiner

Alan A. Mathews

Applicant(s)

NAKAUCHI ET AL.

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12-24-03 & 1-16-04.
2. ☒ The allowed claim(s) is/are 1,3-15 and 56-96.
3. ☒ The drawings filed on 01 May 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

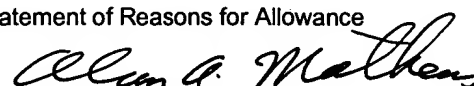
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____



Alan A. Mathews
Primary Examiner
Art Unit: 2851

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance:

The prior art of record does not disclose or suggest a measurement device arranged to measure an intensity of light while said mask is drive, the light emerging from said optical element, and passing through said projection optical system and the transmission portion of said mask, said measurement device including a measurement surface positioned at a plane spaced apart from said mask enough to separately detect respective rays emerging from plural points of a pupil plane of said projection optical system and passing through the transmission portion, and a device arranged to calculate aberration of said projection optical system on the basis of a measurement result of said measurement device in combination with the other elements claimed in independent claim 1.

The prior art of record does not disclose or suggest second mask which is arranged near an image-side focal position of said projection optical system and has a seconding transmission portion, and an actuator for driving said second mask along an image plane of said projection optical system, and a measurement device for measuring a change in intensity of light which is emitted by said illumination system and passes through the first transmission portion, said projection optical system, and the second transmission portion while said scone mask is driven in combination with the other elements recited in independent claim 56.

The prior art of record does not disclose or suggest a second mask which is arranged between said illumination system and said projection optical system and has a second transmission portion, and a second reflecting mirror for deflecting toward the second transmission portion light which is emitted by said illumination system, passes through the first transmission portion and said projection optical system, is reflected by said first reflecting mirror, and passes through said projection optical system again, and a measurement device for measuring an intensity of light which is emitted by said illumination system, passes through the first transmission portion of said first mask and said projection optical system, is reflected by said first reflecting mirror, passes through said projection optical system again, is reflected by said second reflecting mirror, and passes through the second transmission portion of said second mask while said second mask is driven in combination with the other elements claimed in independent claim 65.

The prior art of record does not disclose or suggest a second mask and a reflecting mirror arranged on an image plane side of said projection optical system, an actuator for driving said second mask along the object plane of said projection optical system, and a measurement device for measuring an intensity of light which is emitted by said illumination system, passes through the first transmission portion of said projection optical system, is reflected by said reflecting mirror, passes through said projection optical system again, and passes through the second transmission portion while said

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second mask is driven in combination with the other elements recited in independent claim 71.

The prior art of record does not disclose or suggest a second mask and a reflecting mirror arranged on an object plane side of said projection optical system, an actuator for driving said second mask along the image plane of said projection optical system, and a measurement device for measuring an intensity of light which is emitted by said illumination system, passes through the first transmission portion of said projection optical system, is reflected by said reflecting mirror, passes through said projection optical system again, and passes through the second transmission portion while said second mask is driven in combination with the other elements recited in independent claim 76.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which emerges from the optical element, and passes through the projection optical system and the transmission portion of the mask while the mask is driven along a plane of an image of the optical element formed by the projection optical system, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step in combination with the other steps recited in each of independent claims 81 and 91.

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The prior art of record does not disclose or suggest the method comprising the measurement step of measuring a change in intensity of light which is emitted by the illumination system and passes through the first transmission portion, the projection optical system and the second transmission portion while the second mask is driven along an image plane of the projection optical system and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step in combination with the other steps recited in independent claim 82.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which is emitted by the illumination system, passes through the first transmission portion of the first mask and the projection optical system, is reflected by the first reflecting mirror, passes through the projection optical system again, is reflected by the second reflecting mirror, and passes through the second transmission portion of the second mask while the second mask is driven in a predetermined plane, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step in combination with all the other steps recited in independent claim 83.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which is emitted by the illumination system, passes through the first transmission portion and the projection optical system, is

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reflected by the reflecting mirror, passes through the projection optical system again, and passes through the second transmission portion while the second mask is driven along the object plane of the projection optical system, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step in combination with the other steps reacted in independent claim 84.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which is emitted by the illumination system, passes through the first transmission portion and the projection optical system, is reflected by the reflecting mirror, passes through the projection optical system again, and passes through the second transmission portion while the second mask is driven along an image plane of the projection optical system, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step in combination with the other steps reacted in each of independent claims 85 and 90.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which emerges from the optical element, and passes through the projection optical system and the transmission portion of the mask while the mask is driven along a plane of an image of the optical element formed by the projection optical system, and the arithmetic step of calculating aberration

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of the projection optical system on the basis of a measurement result obtained in the measurement step, and the adjustment step of adjusting the projection optical system on the basis of aberration obtained in the arithmetic step in combination with the other steps recited in independent claim 86.

The prior art of record does not disclose or suggest the measurement step of measuring a change in intensity of light which is emitted by the illumination system and passes through the first transmission portion, the projection optical system, and the second transmission portion while the second mask is driven along an image plane of the projection optical system, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step in combination with the other steps recited in each of independent claims 87 and 92.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which is emitted by the illumination system, passes through the first transmission portion of the first mask and the projection optical system, is reflected by the first reflecting mirror, passes through the projection optical system again, is reflected by the second reflecting mirror, and passes through the second transmission portion of the second mask while the second mask is driven in a predetermined plane, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step,

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and the adjustment step of adjusting the projecting optical system on the basis of the aberration obtained in the arithmetic step in combination with all the other steps recited in each of independent claims 88 and 93.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which is emitted by the illumination system, passes through the first transmission portion of the first mask and the projection optical system, is reflected by the first reflecting mirror, passes through the projection optical system again, is reflected by the second reflecting mirror, and passes through the second transmission portion of the second mask while the second mask is driven along the object plane, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step, and the adjustment step of adjusting the projecting optical system on the basis of the aberration obtained in the arithmetic step in combination with all the other steps recited in independent claims 89.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which is emitted by the illumination system, passes through the first transmission portion and the projection optical system, is reflected by the reflecting mirror, passes through the projection optical system again, and passes through the second transmission portion while the second mask is driven along the object plane, and the arithmetic step of calculating aberration of the projection optical

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system on the basis of a measurement result obtained in the measurement step, and the adjustment step of adjusting the projecting optical system on the basis of the aberration obtained in the arithmetic step in combination with all the other steps recited in independent claims 94.

The prior art of record does not disclose or suggest the method comprising the measurement step of measuring an intensity of light which is emitted by the illumination system, passes through the first transmission portion and the projection optical system, is reflected by the reflecting mirror, passes through the projection optical system again, and passes through the second transmission portion while the second mask is driven along an image plane of the projection optical system, and the arithmetic step of calculating aberration of the projection optical system on the basis of a measurement result obtained in the measurement step, and the adjustment step of adjusting the projecting optical system on the basis of the aberration obtained in the arithmetic step in combination with all the other steps recited in independent claims 95.

It is noted that U. S. Patent No. 6,278,514 has the same assignee as the instant application.

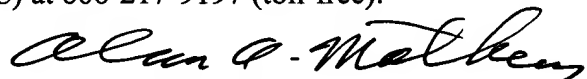
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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan A. Mathews whose telephone number is (571) 272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on (571) 272-2112. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alan A. Mathews
Primary Examiner
Art Unit 2851

AM